

Serial No.: 10/816,084
Amdt. dated Oct. 24, 2005
Reply to Office Action of May 9, 2005

Atty. Docket: 56231-459 (MKS-90CN)

Amendments to the Drawings:

The attached drawing sheet includes changes to Fig. 2. This sheet replaces the original sheet including Fig. 2. In Fig. 2, numeral “12” has been changed to numeral “28” for consistency with the specification. No new matter has been added.

Attachment: Replacement sheet for Fig. 2

REMARKS

The Applicants appreciate the Examiner's thorough examination of the subject application and request reconsideration and further examination of the subject application in view of the preceding amendments to the claims and the following remarks. A Request for Continued Examination is being filed concurrently herewith, under section 37 C.F.R. § 1.114.

As a preliminary matter, Applicants are unsure whether the Examiner entered or considered "Supplemental Amendment A" that was filed by facsimile on April 20, 2005 for the present application. Confirmation that the Office received the amendment was sent to the Applicants' attorneys by facsimile on the same date, and the Public PAIR database indicates that the amendment was processed by the Office. The instant Office Action, however, does not address certain limitations that had been moved into the base claims by that amendment (e.g., those of claim 11 into claim 1, and those of claim 26 into claim 16). No notice of disapproval of entry of the amendment under 37 C.F.R § 1.111(a) or MPEP § 714.03(a)(II) was received by Applicants or referred to in the instant Office Action. Accordingly because Supplemental Amendment A was properly submitted to and was received by the Office, the listing of claims herein reflects the previous changes to the claims as having been entered in the case.

Status of Claims and Request for Reconsideration

Claims 1-10, 12, 13, 16-25, 27, 28, 31-45 remain in the application. Claims 1, 3, 7, 8, 12, 16, 18, 22, 27, 31, 33, 34 have been amended and new claims 35-45 have been added in order to more clearly define the invention. Six of these new claims reinstate formerly pending claims: new claim 35 reinstates formerly pending claim 11; new claim 36 reinstates formerly pending claim 14; new claim 37 reinstates formerly pending claim 15; new claim 38 reinstates formerly pending claim 26; new claim 39 reinstates formerly pending claim 29; and, new claim 40 reinstates formerly pending claim 30. The present application as originally filed supports the amendments. No new matter has been added. Claims 11, 14, 15, 26, 29, and 30 have been cancelled.

Claims 33 and 34 were rejected under 35 U.S.C. § 112, ¶ 1, as failing to comply with the written description requirement. Claims 1-6, 16-20, 25, and 31-43 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,333,272 to McMillin et al ("McMillin"). Claims 7-10, 12, 13, 21-24, 27 and 28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over McMillin as applied to claims 1-6, 16-20, 25 and 31-34 in view of U.S. Patent No. 6,752,166 to Lull et al. ("Lull"). These rejections are traversed and reconsideration is requested in view of the foregoing amendments and following remarks.

Amendments to the Specification and Drawings.

Applicants have amended paragraphs (20), (25), (27), (34), and (36)-(39) of the specification to correct minor informalities found therein. Further, number 12 was used in Figs. 1 and 2 to designate different items. Accordingly, Fig. 2 is being amended to change numeral "12" to numeral "28" consistent with certain changes to the specification.

Information Disclosure Statement

Concerning item 2 of the Office Action, the Examiner stated that the Information Disclosure Statement filed on April 1, 2004 failed to comply with 37 C.F.R. § 1.98(a)(2), noting specifically that a copy of the document identified as "Search report – GB 0300036.1" was not provided. Applicants respectfully point out that this document was included with an Information Disclosure Statement (mailed July 30, 2003) submitted to the Office for the prosecution of the parent application, U.S. Application Serial No. 10/037,882, now U.S. Patent No. 6,766,260, which is assigned to the assignee of the present application, MKS Instruments, Inc. Because the Information Disclosure Statement filed for the present application properly referenced the parent application, all documents cited and submitted with the noted Information Disclosure Statement of the parent application are properly considered as having been submitted to the Office for the present application. See MPEP § 609 III A(2)(E) and 37 C.F.R. § 1.98(d).

Claim Rejections under 35 U.S.C. § 112, ¶ 1

Concerning items 3-4 of the Office Action, claims 33 and 34 have been rejected under 35 U.S.C. § 112, ¶ 1, as failing to comply with the written description requirement. Specifically, the Examiner stated that claims 33 and 34 recite limitation(s) that are not found in the disclosure as originally filed. In making this rejection, the Examiner stated that the “disclosure as originally filed does not support the limitation of regulating current or voltage through a solenoid. The Examiner further stated that “In this office action the orifice setting is taken to be regulated electrically.” Claims 33 and 34 have been amended to clarify that the orifice setting is regulated electrically, e.g., by regulating a voltage or current, respectively, supplied to the solenoid.

Claim Rejections under 35 U.S.C. § 102(e)

Concerning items 5-6 of the Office Action, claims 1-6, 16-20, 25, and 31-43 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,333,272 to McMillin et al (“McMillin”).

The aspects of the invention claimed in amended independent claims 1 and 16, and new independent claims 43 and 46 operate to divide an input mass flow composed of multiple gases into at least two partial or secondary flows. These secondary flows are then measured to achieve a desired flow ratio of the multiple gases within the individual secondary flows, which may be provided to specific areas of a process chamber. Each flow line includes a flow meter measuring flow through the secondary flow line and providing a signal indicative of the measured flow for the control of the flow ratio among respective outlet lines that feed one or more process chambers. These aspects operate without the requirement of measuring overall flow into or through the system, which is the case for McMillin.

For example, amended independent claim 1 “a controller connected to each of the flow meters and the valves of the secondary flow lines, and the user interface, and programmed to [among

other things] calculate an actual ratio of flow through the flow lines based upon the measured flow, wherein said calculation is made without reference to the total flow received at the inlet, nor to the sum total of the secondary flows through the secondary flow lines the total flow received at the inlet, nor to the sum total of the secondary flows through the secondary flow lines”, and from the calculation “calculate the desired flow through at least one of the flow lines if the actual ratio is unequal to the desired ratio”, and “provide a signal indicative of the desired flow to at least one of the valves.

Amended independent claim 16 includes the step of “calculating an actual ratio of mass flow through the secondary flow lines based upon the measured flows, wherein said calculation is made without reference to the total mass flow through the inlet, nor the sum total of the mass flows through the secondary flow lines; and calculating a desired flow through at least one of the secondary flow lines if the actual ratio does not equal the desired ratio; and regulating the flow line to the desired flow through the at least one of the secondary flow lines.”

Claim 41 recites a controller that is configured and arranged to, inter alia, “(c) calculate an actual ratio of flow through the secondary flow lines based upon the actual flow through at least one of the secondary flow lines, wherein said calculation is made without reference to the total flow through the system inlet, nor the sum total of the secondary flows through the secondary flow lines, and (d) adjust one or more of the control signals applied to one or more of the control valves as a function of the difference between the actual ratio and desired ratio.”

Claim 44 recites a method including: (c) calculating an actual ratio of flow through the secondary flow lines based upon the actual flow through at least one of the secondary flow lines, wherein said calculation is made without reference to the total flow through the system inlet, nor the sum total of the secondary flows through the secondary flow lines, and (d) adjusting one or more of the control signals applied to one or more of the control valves as a function of the difference between the actual ratio and desired ratio.

In contrast, McMillin teaches systems and methods for gas distribution in which a total entering flow is measured or determined by either adding up sub-flows to derive a total flow or measuring the total inlet flow as part of a process of providing proper gas ratios to different locations of a process chamber. For example, McMillin teaches, “By comparing the total flow . . . with the flow measured by the meter in the chamber delivery line 12, the control can adjust the degree of throttling in the valve 36 in line 14 to achieve the desired flow distribution. Similarly, McMillin teaches “READ OR DETERMINE THE TOTAL MIXED GAS FLOWRATE TO THE PROCESSING CHAMBER” see McMillin FIG. 2 at step 52. Such measurements represent different operational functions, as well as added complexities, additional costs, and potential for errors in gas measurement and delivery compared to the present invention as claimed. Thus, McMillin does not possess the functional characteristics of claims 1 and 16 of the present application.

Accordingly, McMillin does not teach each and every element as arranged, respectively, in amended independent claims 1, 16, 43 and 46, and therefore is not a proper basis for a rejection under 35 U.S.C. § 102(e). Claims 2-6, 31, 33, and 34 depend directly or indirectly from claim 1, and thus are patentable for at least the same reasons described for claim 1. Likewise, claims 17-20, 25, and 32 depend directly or indirectly from claim 16, and are therefore patentable for at least the same reasons described previously for claim 16. In addition claims 44 and 45 dependent from claim 43 and claim 47 depends from claim 46, and are all therefore patentable for at least the same reasons as described previously for claims 43 and 46.

Claim Rejections under 35 U.S.C. § 103(a)

Concerning item 7 of the Office Action, claims 7-10, 12, 13, 21-24, 27 and 28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over McMillin as applied to claims 1-6, 16-20, 25 and 31-34 in view of U.S. Patent No. 6,752,166 to Lull et al. (“Lull”). Applicants respectfully traverse the Examiner’s contention made for this rejection that “the patent to McMillin et al. discloses the claimed invention with the exception of explicitly disclosing (a) presence of three

secondary flow lines or (b) a pressure sensor for measuring the pressure at either the inlet or at the secondary flow lines.”

For a rejection to be proper under 35 U.S.C. § 103(a), the combination of references must teach or suggest each and every limitation as arranged in the claims at issue. This rejection is improper because Lull does not cure the deficiencies noted above for McMillin.

Lull teaches a fluid control system that includes a fluid inlet to receive a flow of process fluid and either pressure transducers or a proportional diverter valve to provide a predetermined portion of the process fluid in fluid outlets to a process chamber. Lull does not teach or suggest the aspects of the invention claimed in the respective base claims of 7-10, 12, 13, 21-24, 27 and 28, i.e., independent claims 1 and 16, and new claims 43 and 46. Thus Lull, like McMillin, fails to teach or suggest systems and methods that operate to divide an input mass flow composed of multiple gases into at least two partial or secondary flows, in which the secondary flows are measured to achieve a desired flow ratio of the multiple gases within the individual secondary flows without the need for any overall measurement of the total input flow, pressure transducers, or proportional diverter valves.

Accordingly, neither McMillin nor Lull, whether considered alone or in combination, disclose or suggest the limitations of amended independent claims 1 and 16, as well as new claims 43 and 46. Because claims 7-10, 12, and 13 depend from claim 1, they are patentable for at least the same reasons described above for claim 1. Because claims 21-24, 27 and 28 depend from claim 16, they are patentable for at least the same reasons described above for claim 16. Applicants, therefore, request reconsideration and withdrawal of the rejection of claims of 7-10, 12, 13, 21-24, 27 and 28 under 35 U.S.C. § 103(a).

Additional Issues

Concerning item 9 of the Office Action, the Examiner noted that the previously stated rejection of claims 33 and 34 under 35 U.S.C. § 112, first paragraph, was not responded to by the

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Applicants in the last Amendment. Applicants have addressed and cured this rejection by the amendments herein to claims 33 and 34. Applicants furthermore agree with the Examiner that the present application is a continuation application of the application corresponding to U.S. Patent No. 6,766,260, assigned to MKS Instruments Inc.; previous reference to a divisional application may have been an inadvertent error.

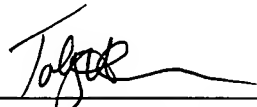
Conclusion

In view of the amendments and remarks submitted herein, Applicants believe that all claims in the present application are in condition for allowance, and respectfully request a Notice of Allowance for the application. If a telephone conference will expedite prosecution of the application, the Examiner is invited to telephone the undersigned.

Authorization is hereby given to charge our deposit account, No. 50-1133 for a three month extension under 37 C.F.R. § 1.136.

Respectfully submitted,
McDermott Will & Emery LLP

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